# Liquid phase synthesis of methylene lactones using novel catalyst

**Description of Technology:** The invention pertains to a method of producing unsubstituted and substituted alpha-methylene lactones by a liquid phase reaction of starting lactones with formaldehyde in the presence of a novel catalyst that provides high selectivity and conversion.

**Patent Listing:**

1. **US Patent No. 7,199,254**, Issued April 3, 2007, "Liquid phase synthesis of methylene lactones using novel catalyst"
   http://patft.uspto.gov/netacgi/nph-Parser?Sect2=PTO1&Sect2=HITOFF&p=1&u=%2Fnetahtml%2FPTO%2Fsearch-bool.html&r=1&f=G&l=50&d=PALL&RefSrch=yes&Query=PN%2F7199254

**Market Potential**: Alpha-methylene-gamma-butyrolactone and methyl alpha-methylene-gamma-butyrolactone are useful monomers in the preparation of both homopolymers and copolymers. In addition, the alpha-methylene-gamma-butyrolactone group is an important structural feature of many sesquiterpenes of biological importance.

A problem inherent in the method is that the homogeneous catalysts must be used at high concentration to achieve good yields, but are not easily recycled. On the other hand, the heterogeneous catalysts, while more easily recoverable, do not provide as high conversion and selectivity.

It would be advantageous, therefore, to have a lactone conversion process that not only provides high conversion and selectivity, but also allows for easy catalyst recovery.

This need is met by the present invention, which, in its first aspect, is a process for preparing a reaction product comprising an alpha-methylene lactone of the Formula II, said process comprising reacting a lactone of the Formula I with formaldehyde.

**Benefits:**

- Produces higher yields, conversion, and selectivity
- Allows for easy catalyst recovery

**Applications:**

- Production of specific lactones

*Contact: Ken Anderson*
*Director, Entrepreneurial & Small Business Support, Delaware Economic Development Office (DEDO)*
*Carvel State Building, 820 French Street, Wilmington, DE, 19801*
*Phone: (302) 577-8496, Fax: (302) 577-8499, Email: Kenneth.R.Anderson@state.de.us*